

**Amendments to the Claims**

**This listing of claims will replace all prior versions, and listings, of claims in the application:**

**Listing of Claims:**

1. (Currently amended) A method of generating authentication data for authenticating a physical object; the method comprising acts of:

measuring a property set Y of the object using a measurement procedure;

creating a property set I from the measured property set Y that meet a predetermined robustness criterion;

creating a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating acts are guided by a criteria W;

generating a control value V in dependence on properties of the property set A; and

inserting the control value V and the criteria W in the authentication data; and

storing the control value V, the criteria W and the authentication data to a storage device.

2. (Previously presented) The method as claimed in claim 1, wherein the act of creating the property set A includes performing a contracting transformation that transforms given ranges of input properties to corresponding output values.

3. (Previously presented) The method as claimed in claim 2, wherein the contracting transformation transforms a property to a binary number representative of whether the property has a positive or negative value.

4. (Previously presented) The method as claimed in claim 1, wherein the act of creating the property set A includes an act of selecting a subset of the property set I.

5. (Previously presented) The method as claimed in claim 4, including an act of creating the criteria W for controlling the selection of the subset.

6. (Previously presented) The method as claimed in claim 5, including an act of creating unique criteria W based on respective authentication applications, wherein different respective authentication applications have different unique criteria.

7. (Previously presented) The method as described in claim 1, wherein the predetermined robustness criterion is based on a signal to noise ratio of the measured properties and the act of creating the property set I includes an act of performing a transformation  $\Gamma$  on the property set Y to create two disjunct property sets  $I_1$  and  $I_2$  where a signal to noise ratio of properties of the property set  $I_1$  are estimated to be higher than a signal to noise ratio of properties of the property set  $I_2$ ; and wherein the property set  $I_1$  is used as the property set I.

8. (Previously presented) The method as claimed in claim 7, wherein the transformation  $\Gamma$  is a linear transformation that converts a vector representing the property set Y to a vector with components  $\alpha_i$  representing the property set I, where each vector component  $\alpha_i$  is independent of the

other vector components  $\alpha_j$  ( $j \neq i$ ) and wherein the vector components are sorted according to an estimated signal to noise ratio.

9. (Previously presented) The method as claimed in claim 7, including the act of creating the transformation  $\Gamma$  in dependence on a statistical property of the measurement procedure.

10. (Previously presented) The method as claimed in claim 9, wherein the statistical property includes a covariance matrix derived from estimated properties  $X$  of the object and a corresponding statistical distribution  $F$  determined during the measuring of the property set  $Y$ .

11. (Previously presented) The method as claimed in claim 7, including an act of deriving a threshold from a noise level in the measured property set and assigning created properties with an absolute value larger than the threshold to set  $I_1$ .

12. (Previously presented) The method as claimed in claim 1, wherein the act of creating the control value  $V$  includes acts of:

converting each property of the property set  $A$  into a binary digit, and  
performing a cryptographic function on a combination of the binary digits.

13. (Previously presented) The method as claimed in claim 12, wherein the cryptographic function is a one-way function.

14. (Currently amended) A computer program stored on a computer readable memory device for generating authentication data for authenticating a physical object, the computer program being operative to cause a processor to:

measure a property set Y of the object using a measurement procedure;

create a property set I from the measured property set Y that meet a predetermined robustness criterion;

create a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating acts are guided by a criteria W;

generate a control value V in dependence on properties of the property set A; and

insert the control value V and the criteria W in the authentication data; and

store the control value V, the criteria W and the authentication data to a storage device.

15. (Currently amended) A method of authenticating a physical object; the method comprising acts of:

measuring a property set Y of the object using a measurement procedure;

creating a property set I from the measured property set Y that meet a predetermined robustness criterion;

creating a property set A from the property set I that includes less information on the actual properties than property set Y;

generating a control value V' in dependence on properties of the property set A,

retrieving a control value V and a criteria W that has been generated for the physical object during an enrollment ~~including a criteria W~~, wherein the creating acts are guided by the criteria W;

and

authenticating the physical object if there is a predetermined correspondence between the generated control value V' and the retrieved control value V.

16. (Currently amended) A computer program stored on a computer readable memory device for authenticating a physical object, the computer program being operative to cause a processor to:

measure a property set Y of the object using a measurement procedure;

create a property set I from the measured property set Y that meet a predetermined robustness criterion;

create a property set A from the property set I that includes less information on the actual properties than property set Y;

generate a control value V' in dependence on properties of the property set A,

retrieve a control value V and a criteria W that has been generated for the physical object during an enrollment ~~including a criteria W~~, wherein the creating the property set I and the property set A are guided by the criteria W; and

authenticate the physical object if there is a predetermined correspondence between the generating a generated control value V' and the retrieved control value V.

17. (Currently amended) A system for authenticating a physical object; the system including an enrollment device, an authentication device, and a storage for storing authentication data;

the enrollment device including:

an input for receiving a property set Y of the object measured using a measurement

procedure;

a processor for creating a property set I from the measured property set Y that meet a predetermined robustness criterion; creating a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating the property set I and the property set A are guided by a criteria W; and generating a control value V in dependence on properties of the property set A and the criteria W; and

an output for supplying the control value V and the criteria W to the storage as part of the authentication data; and

the authentication device including:

an input for receiving a property set Y' of the object measured using a measurement procedure and for receiving the control value V from the storage including the criteria W;

a processor for creating a property set I' from the measured property set Y' that meet a predetermined robustness criterion; for creating a property set A' from the property set I' that includes less information on the actual properties than property set Y', wherein the creating the property set I' and the property set A' are guided by the criteria W; for generating a control value V' in dependence on properties of the property set A'; and for authenticating the physical object if there is a predetermined correspondence between the generated control value V' and the retrieved control value V; and

an output for issuing a signal indicating whether or not the physical object has been authenticated.

18. (Currently amended) An authentication device for authenticating a physical object, the

authentication device comprising:

an input for receiving a property set Y of a physical object measured using a measurement procedure and for receiving a control value V and a criteria W from a storage ~~including a criteria W~~;

a processor for creating a property set I from the measured property set Y that meet a predetermined robustness criterion; for creating a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating the property set I and the property set A are guided by the criteria W; for generating a control value V' in dependence on properties of the property set A; and for authenticating the physical object if there is a predetermined correspondence between the generated control value V' and the retrieved control value V; and

an output for issuing a signal indicating whether or not the physical object has been authenticated.